

Claim 1 stands rejected under 35 U.S.C. Section 103(a) as being allegedly unpatentable over Mitsui (US 5,408,345) in view of both Kikuchi (JP 5-323336) and Tanaka (JP 4-295824). This 3-way Section 103(a) rejection is respectfully traversed for at least the following reasons.

Claim 1 requires "a continuous electrode pattern for adsorbing an ionic impurity is provided on the interlayer insulating film in the surrounding region so as to surround the display pixel area on all sides, wherein the continuous electrode pattern for adsorbing an ionic impurity is provided on only one of the substrates and is at least partially coplanar with the pixel electrodes." For example, see Fig. 2 of the instant application which illustrates that the electrode pattern 105 for adsorbing an ionic impurity is provided on only one substrate 101 (and not on substrate 102) and is at least partially coplanar with the pixel electrodes 202. Fig. 2 further illustrates that the electrode pattern 105 for adsorbing an ionic impurity is on a different plane(s) than the gate lines 203; and TFTs 201. The cited art fails to disclose or suggest the aforesaid underlined aspect of claim 1, either taken alone or in the alleged 3-way combination.

The Office Action admits that Mitsui fails to disclose any sort of electrode pattern for adsorbing an ionic impurity. Recognizing this flaw in Mitsui, the Office Action cites Kikuchi and Tanaka. However, these references significant differ from the invention of claim 1. Kikuchi's ion trap electrodes 3, 6 are provided along *only one side* of the display (they do not "surround" the display pixel area on all sides); and are also required on *both* substrates. Tanaka is also flawed in that Tanaka's electrodes 4 are provided in respective locations coplanar with address lines 2, 3.

Thus, it can be seen that the cited art teaches directly away from the invention of claim 1. For example, since Tanaka's dummy electrodes 4 are coplanar with the address lines 2, 3, they cannot be coplanar with the pixel electrodes. Tanaka teaches directly away from the invention of claim 1 in this regard. Moreover, Kikuchi requires that the electrode pattern 3, 6 be provided on both opposing substrates, which is clearly excluded by the invention of claim 1. In other words, the cited art not only fails to disclose or suggest the invention of claim 1, but teaches directly away from the same.

There is no reason why one of ordinary skill in the art would have ever modified the cited references in order to provide "a continuous electrode pattern for adsorbing an ionic impurity is provided on the interlayer insulating film in the surrounding region so as to surround the display pixel area on all sides, wherein the continuous electrode pattern for adsorbing an ionic impurity is provided on only one of the substrates and is at least partially coplanar with the pixel electrodes" as required by claim 1. This is especially the case since Kikuchi teaches directly away from the invention of claim 1 by requiring electrodes 3, 6 on both substrates, and not surrounding the display area; and since Tanaka teaches away from the invention by requiring that the electrodes 4 be coplanar with the address lines and not the pixel electrodes. The invention of claim 1 is respectfully submitted to clearly define over the art of record.

Claim 8 requires "all segments of the electrode pattern for adsorbing an ionic impurity are provided on the same substrate and are at least partially coplanar with the pixel electrodes so that the segments are at a different elevation(s) than the gate signal



lines." Again, the cited art of record fails to disclose or suggest this aspect of claim 8, either taken alone or in the alleged combination.

Claim 10 requires "an electrode pattern for adsorbing an ionic impurity is provided on the interlayer insulating film in the surrounding region on only one of the substrates, said pattern being coplanar with the pixel electrodes; the pair of substrates are arranged so that a rubbing direction of one of the substrates which is represented by a first arrow crosses a rubbing direction of the other one of the substrates which is represented by a second arrow, the first and second arrows each extending from its tail to its head; and the electrode pattern extends only along one side of the display pixel area interposed between the head of the first arrow and the head of the second arrow." Again, the cited art of record fails to disclose or suggest this aspect of claim 10, either taken alone or in the alleged combination.

Claims 12 and 13 have been amended so as to clarify that the electrode pattern extends "only" along the recited sides of the display device. The cited art fails to disclose or suggest this aspect of claims 12-13, either taken alone or in the alleged combination. Moreover, the Examiner appears to have indicated that this would place claims 12-13 in condition for allowance (see page 3, first full paragraph, of the Office Action).

For at least the foregoing reasons, it is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.



FUJIOKA et al

Serial No. 09/577,007



JAR:caj

1100 North Glebe Road, 8th Floor

Arlington, VA 22201-4714

Telephone: (703) 816-4000

Facsimile: (703) 816-4100

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

By: \_\_\_\_\_

A handwritten signature in dark ink, appearing to read "J. Rhoa", written over a horizontal line.

Joseph A. Rhoa

Reg. No. 37,515

RECEIVED  
AUG 20 2002  
TECHNOLOGY CENTER 2800

A handwritten signature in dark ink, consisting of a stylized, looped mark.

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS**

1. (*Amended*) A liquid crystal display device, comprising:

a pair of substrates opposing each other;

a liquid crystal layer interposed between the pair of substrates;

a plurality of switching elements arranged in a matrix pattern on one of the pair of substrates;

gate signal lines for supplying gate signals for driving the switching elements;

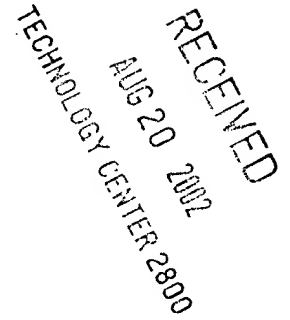
source signal lines for supplying display signals to the switching elements;

an interlayer insulating film provided on one of the pair of substrates over the gate signal lines and the source signal lines; and

pixel electrodes provided over the gate signal lines and the source signal lines via the interlayer insulating film, wherein:

the interlayer insulating film on one of the pair of substrates extends to a surrounding region of a display pixel area; and


[an] a continuous electrode pattern for adsorbing an ionic impurity is provided on the interlayer insulating film in the surrounding region so as to surround the display pixel area on all sides, wherein the continuous electrode pattern for adsorbing an ionic impurity is provided on only one of the substrates and is at least partially coplanar with the pixel electrodes.



8. (*Amended*) A liquid crystal display device, comprising:

- a pair of substrates opposing each other;
- a liquid crystal layer interposed between the pair of substrates;
- a plurality of switching elements arranged in a matrix pattern on one of the pair of substrates;
- gate signal lines for supplying gate signals for driving the switching elements;
- source signal lines for supplying display signals to the switching elements;
- an interlayer insulating film provided on one of the pair of substrates over the gate signal lines and the source signal lines;
- pixel electrodes provided over the gate signal lines and the source signal lines via the interlayer insulating film, wherein:
  - the interlayer insulating film on one of the pair of substrates extends to a surrounding region of a display pixel area;
  - an electrode pattern for adsorbing an ionic impurity is provided on the interlayer insulating film in the surrounding region; and
  - the electrode pattern is divided into a plurality of segments; and an electric signal is individually input to each of the segments, and wherein all segments of the electrode pattern for adsorbing an ionic impurity are provided on the same substrate and are at least partially coplanar with the pixel electrodes so that the segments are at a different elevation(s) than the gate signal lines.

9. (*Unamended*) A liquid crystal display device, comprising:



a pair of substrates opposing each other;

a liquid crystal layer interposed between the pair of substrates;

a plurality of switching elements arranged in a matrix pattern on one of the pair of substrates;

gate signal lines for supplying gate signals for driving the switching elements;

source signal lines for supplying display signals to the switching elements;

an interlayer insulating film provided on one of the pair of substrates over the gate signal lines and the source signal lines;

pixel electrodes provided over the gate signal lines and the source signal lines via the interlayer insulating film, wherein:

the interlayer insulating film on one of the pair of substrates extends to a surrounding region of a display pixel area;

an electrode pattern for adsorbing an ionic impurity is provided on the interlayer insulating film in the surrounding region;

the display pixel area has a generally rectangular shape;

the pair of substrates are arranged so that a rubbing direction of one of the substrates which is represented by a first arrow crosses a rubbing direction of the other one of the substrates which is represented by a second arrow, the first and second arrows each extending from its tail to its head; and

the electrode pattern extends only along three sides of the display pixel area, including a first side interposed between the head of the first arrow and the head of the



second arrow, and second and third sides which respectively extend from opposite ends of the first side.

10. (*Amended*) A liquid crystal display device, comprising:

- a pair of substrates opposing each other;
- a liquid crystal layer interposed between the pair of substrates;
- a plurality of switching elements arranged in a matrix pattern on one of the pair of substrates;
- gate signal lines for supplying gate signals for driving the switching elements;
- source signal lines for supplying display signals to the switching elements;
- an interlayer insulating film provided on one of the pair of substrates over the gate signal lines and the source signal lines;
- pixel electrodes provided over the gate signal lines and the source signal lines via the interlayer insulating film, wherein:
- the interlayer insulating film on one of the pair of substrates extends to a surrounding region of a display pixel area;
- an electrode pattern for adsorbing an ionic impurity is provided on the interlayer insulating film in the surrounding region on only one of the substrates, said pattern being coplanar with the pixel electrodes;
- the pair of substrates are arranged so that a rubbing direction of one of the substrates which is represented by a first arrow crosses a rubbing direction of the other





one of the substrates which is represented by a second arrow, the first and second arrows each extending from its tail to its head; and

the electrode pattern extends only along one side of the display pixel area interposed between the head of the first arrow and the head of the second arrow.

12. (*Amended*) A liquid crystal display device, comprising:

a pair of substrates opposing each other;

a liquid crystal layer interposed between the pair of substrates;

a plurality of switching elements arranged in a matrix pattern on one of the pair of substrates;

gate signal lines for supplying gate signals for driving the switching elements;

source signal lines for supplying display signals to the switching elements;

an interlayer insulating film provided on one of the pair of substrates over the gate signal lines and the source signal lines;

pixel electrodes provided over the gate signal lines and the source signal lines via the interlayer insulating film, wherein:

the interlayer insulating film on one of the pair of substrates extends to a surrounding region of a display pixel area;

an electrode pattern for adsorbing an ionic impurity is provided on the interlayer insulating film in the surrounding region;

the liquid crystal display device includes a generally rectangular display pixel area;

a rubbing direction of at least one of the substrates is represented by an arrow pointing to a corner of the generally rectangular display pixel area; and

the electrode pattern extends along only two sides of the generally rectangular display pixel area which are connected together by the corner that is pointed to by the arrow.

13. (*Amended*) A liquid crystal display device, comprising:

a pair of substrates opposing each other;

a liquid crystal layer interposed between the pair of substrates;

a plurality of switching elements arranged in a matrix pattern on one of the pair of substrates;

gate signal lines for supplying gate signals for driving the switching elements;

source signal lines for supplying display signals to the switching elements;

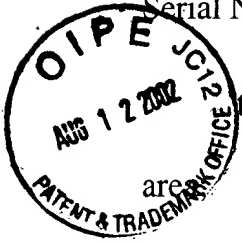
an interlayer insulating film provided on one of the pair of substrates over the gate signal lines and the source signal lines;

pixel electrodes provided over the gate signal lines and the source signal lines via the interlayer insulating film, wherein:

the interlayer insulating film on one of the pair of substrates extends to a surrounding region of a display pixel area;

an electrode pattern for adsorbing an ionic impurity is provided on the interlayer insulating film in the surrounding region;





the liquid crystal display device includes a generally rectangular display pixel area, and a rubbing direction of one of the substrates is represented by a first arrow pointing to a first corner of the generally rectangular display pixel area, and a rubbing direction of the other one of the substrates is represented by a second arrow pointing to a second corner of the generally rectangular display pixel area; and

the electrode pattern extends along only a first pair of sides which are connected together by the first corner and along a second pair of sides which are connected together by the second corner, wherein the first pair of sides and the second pair of sides may share one side with each other.

the electrode pattern extends along only a first pair of sides which are connected together by the first corner and along a second pair of sides which are connected together by the second corner, wherein the first pair of sides and the second pair of sides may share one side with each other.

RECEIVED  
AUG 20 2002  
TECHNOLOGY CENTER 2800

15. (Amended) A liquid crystal display device, comprising:

a pair of substrates;

a liquid crystal layer between the pair of substrates;

a plurality of switching elements arranged on one of the pair of substrates;

pixel electrodes provided in a display pixel area of the display device;

an insulating film on one of the pair of substrates and at least partially covering address lines, the insulating film extending to a surrounding region of the display pixel area; and

an electrode pattern for adsorbing an ionic impurity provided over the interlayer insulating film in the surrounding region so as to surround the display pixel area on all sides thereof and so as to be at least partially coplanar with the pixel electrodes.